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Inventor Name Search Result

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Last Name = SCHLACHTER
First Name = HERBERT

Application#	Patent#	Status	Date Filed	Title	Inventor Name
08983637	6471969	150	03/30/1998	TWO-PHASE PREPARATION	SCHLACHTER, HERBERT
09743577	Not Issued	71	03/12/2001	Skin and tissue care and/or treatment agent	SCHLACHTER, HERBERT

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Back to PALM | ASSIGNMENT | OASIS | Home page

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Tea Trees and Their Therapeutic Properties

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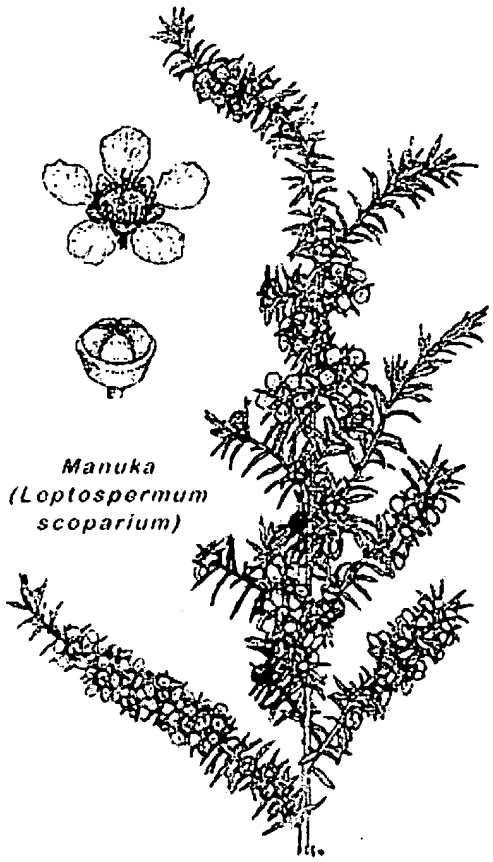
Recently, there has been a significant increase in the use of therapeutically active compounds extracted from plants, commonly called phytochemicals. Although the flora of New Zealand and Australia are rich in unique species, very few of these native plants have been tested for medicinal constituents. The family Myrtaceae contains many plants, including the Australian tea tree (*Melaleuca alternifolia*) and its New Zealand equivalents manuka (*Leptospermum scoparium*) and kanuka (*Kunzea ericoides*, formerly *Leptospermum ericoides*), which are currently being investigated for their therapeutic properties. These species have been known collectively as "tea trees" since Captain Cook used their leaves to brew a strong tea for his sailors. Parts of the trees were used extensively by the early settlers of both countries, and the Maori and aboriginal people have been using parts of tea trees therapeutically for centuries. Various preparations of the gum, sap, seed pods, leaves, bark or flowers of manuka have been used both externally and internally to treat many conditions, such as sores, constipation, colic, fever and coughs, among other aliments (see table below).

Therapeutic properties of Australian tea tree oil

Australian tea tree oil, which is commercially available in the United States, has a wide range of topical applications and is commonly used to treat skin and respiratory infections. Surprisingly, the oil is active against all three categories of infectious organisms: bacteria, viruses and fungi. Tea tree oil is an effective treatment for many skin conditions, such as cold sores, the blisters of shingles and chicken pox, verrucae, warts, acne, large inflamed spots and nappy rash. It is also effective against fungal infections, such as ringworm, athlete's foot and thrush, as well as dandruff--a mild form of



seborrheic dermatitis.

Tea tree oil is rich in terpene alcohols, such as terpinen-4-ol, which is thought to be the active germicidal component, and 1,8-cineol (eucalyptol), which gives eucalypts their characteristic strong fragrance and medicinal properties. High-terpinen-4-ol oils are therapeutically more important than high-cineol oils because the latter irritate mucous membranes and the skin. Numerous instances of contact dermatitis associated with the use of tea tree oil have been reported and resulted in the discovery that 1,8-cineol was the allergen. Most commercial tea tree oils contain less than 10% 1,8-cineol and between 30% and 45% terpinen-4-ol. Nevertheless, the oil should be patch tested on the skin before use.

The antimicrobial activity of tea tree oil has been demonstrated against several common bacterial and fungal pathogens (see table on next page), which were cultured in nutrient media to which tea tree oil was added. It is especially interesting that methicillin and mupirocin resistant *Staphylococcus aureus* were susceptible to tea tree oil. Terpinen-4-ol was active against all the test organisms, while 1,8-cineol was inactive against them.

A number of studies have compared tea tree oil with conventional medications:

- The topical application of 5% tea tree oil versus 5% benzoyl peroxide has been investigated in the treatment of acne vulgaris caused by the microorganism *Propionibacterium acnes*. Both compounds reduced the number of acne lesions, although the action of tea tree oil was slower, possibly due to the use of a suboptimal concentration. Tea tree oil produced fewer side effects than the benzoyl peroxide.

- The use of 10% tea tree oil cream has been compared with 1% tolnaflate and placebo creams in the treatment of tinea pedis, or ringworm. This is the commonest form of superficial dermal infection caused by several related fungi. Patients in the tea tree group and tolnaflate group had significant clinical improvement, but the tea tree oil did not cure the condition. However, as with the acne study, the concentration of the oil may have been suboptimal. Unlike the oil, tolnaflate use resulted in minor skin irritation.

- In another study, the topical application of 1% clotrimazole solution or 100% tea tree oil for the treatment of toenail disease (onychomycosis) resulted in nearly identical clinical improvement.

- Gynecological conditions, including vaginal infections like trichomonal vaginitis, have been successfully treated with tea tree oil. Anaerobic (bacterial) vaginosis is

usually treated with oral nitroimidazoles like metronidazole, but these drugs may cause toxic side effects, and long-term recurrence is very high. Topical treatment with tea tree oil may be more effective because the abnormal bacterial flora is replaced by normal lactobacillus.

Therapeutic properties of manuka honey

Honey was originally used therapeutically for its antibacterial properties, but was replaced by antibiotics, such as penicillin and synthetic drugs, in the 1940s and 1950s. There is now a resurgent interest in honey as a topical antibacterial agent for the treatment of surface infections, such as ulcers, bed sores, and those resulting from burns, injuries and surgical wounds. The antibacterial activity of honey has been attributed to its high osmolarity, acidity and hydrogen peroxide content. Manuka honey has recently attracted attention, however, because its antibacterial activity is not only attributable to the hydrogen peroxide content, but is also due to plant-derived components.

The importance of phytochemicals in honey is supported by the observation that wounds in laboratory rats were healed more rapidly by floral honey than by honey from sugar-fed bees. The bacterium *Staphylococcus aureus*, which has developed resistance to many antibiotics and has become the predominant agent of wound sepsis in hospitals, is also very susceptible to the antibacterial activity of honey, particularly the non-peroxide activity of manuka honey. The antibacterial activity of honey, however, can be destroyed by heating, including pasteurization.

The antimicrobial activity of manuka honey has been compared to other honey in several studies (see table):

- Different honeys have been tested against *Escherichia coli* and *Staphylococcus aureus*, which are microorganisms that infect wounds. These two organisms were most sensitive to manuka honey, again illustrating the presence of its special constituents.

- Both manuka honey and heather honey, which has activity due primarily to hydrogen peroxide, inhibited *Staphylococcus aureus* and *Pseudomonas aeruginosa*,

Bacterial and fungal microorganisms against which tea tree oil (1) or manuka honey (2) has been shown to be effective in culture

MICROORGANISM
Fungi
Aspergillus flavus (1)
Aspergillus niger (1)
Candida albicans (1)
Malassezia furfur (1)
Bacteria
Escherichia coli (1,2)
Propionibacterium acnes (1)
Proteus vulgaris (1)
Pseudomonas aeruginosa (1)
Staphylococcus aureus (1,2)
Citrobacter freundii (2)
Proteus mirabilis (2)
Pseudomonas aeruginosa (2)
Salmonella typhimurium (2)
Streptococcus faecalis (2)
Streptococcus pyogenes (2)
Helicobacter pylori (2)

but only manuka honey inhibited a number of other bacteria.

- The antibacterial activity of unpasteurized honey from 26 New Zealand floral sources was tested against Staphylococcus aureus. Both manuka and kanuka honey had high antibacterial activity, and most of the effectiveness of manuka honey was attributed to a substance other than hydrogen peroxide.

- More recently, manuka honey has been found to be effective against *Helicobacter pylori*, which is the pathogen responsible for gastric or peptic ulcers and implicated in gastric cancer. *Helicobacter pylori* isolated from biopsies of gastric ulcers were sensitive to a 20% solution of manuka honey, but were not affected by a 40% solution of another honey in which the antibacterial activity was primarily due to its hydrogen peroxide content. Growth of these bacteria was prevented completely by a 5% solution of manuka honey.

Future prospects

Leptospermum species, including manuka, are indigenous to both Australia and New Zealand, but have not been commercially exploited until very recently. In Zaire, East Africa, South Africa and Guatemala, oil is extracted from a related species, *Leptospermum citratum*, or "lemon scented tea tree", which is an excellent source of citral and citronellal. The oil from *Melaleuca bracteata*, or "black tea tree", is extracted commercially in Australia as a source of methyl eugenol, commonly used as an insect repellent. Manuka oil (*Leptospermum scoparium*) collected from Australia and the East Cape region of New Zealand has recently been more fully characterized. Oil from the Australian *Leptospermum scoparium* was found to have the highest levels of 1,8-cineol, while manuka from the East Cape region of New Zealand had lower levels of 1,8-cineol and the highest level of leptospermone, a triketone compound that possesses antiseptic and antifungal activity.

Manuka oil has recently been tested against two other organisms, *Bacillus subtilis* and the dermatophyte *Trichophyton mentagrophytes*. Oil distilled from plants collected in the East Cape region of New Zealand showed the highest antimicrobial activity, while the Australian oil showed no activity against these organisms. In clinical trials, manuka oil from New Zealand has proved effective against athlete's foot, ringworm, acne, thrush, and some antibiotic-resistant organisms, possibly due to it high level of leptospermone.

Research that I carried out in New Zealand indicated that several components of manuka inhibited enzymes called cysteine proteases, which have been implicated in muscle-wasting diseases like muscular dystrophy, viral replication, and tumor invasion and metastasis. The screening of New Zealand native plants for enzyme inhibitory activities by my coworkers indicated that extracts of manuka also inhibited other enzymes of therapeutic importance. These results suggest that further research into the properties of manuka and related plants is warranted and likely to reveal novel therapeutic applications with minimal side-effects.

Last updated November, 1998

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Fall/Winter 1998
Table of Contents

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WEST Search History

Hide Items | Restore | Clear | Cancel

DATE: Thursday, February 01, 2007

Hide?	Set Name	Query	Hit Count
		DB=PGPB,USPT,USOC,EPAB,JPAB,DWPI,TDBD; PLUR=YES; OP=OR	
☐	L137	5,693,318.pn.	2
☐	L135	5145686.pn. and lysine	2
☐	L128	L127 and @ad<19980715	1026
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☐	L124	L123 and (acne or blemishes)	22
☐	L123	L122 and (topical or cosmetic)	267
☐	L122	L118 and @ad<19980715	551
☐	L121	L120 and @ad<19980715	21
☐	L120	L119 and (topical or cosmetic)	252
☐	L119	l118 and acne	280
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☐	L114	L113 and acne	403
☐	L113	l112 and cosmetic	1493
☐	L109	l108 and @ad<19980715	37
☐	L108	L104 near7 astringent	112
☐	L107	l105 and @ad<19980715	219
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☐	L100	6,197,317.pn.	2
☐	L98	l81 same (treat$ same acne)	318

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☐	L93	l90 and sunscreen	33
☐	L92	l90 and (zinc adj oxide)	11
☐	L91	L90 and acne	7
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☐	L87	L86 and (topical or cosmetic)	1248
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☐	L84	L83 and (cosmetic or topical)	429
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☐	L69	l66 and topical	153
☐	L68	l67 and @ad<19980715	18
☐	L67	L65 same antioxidant	109
☐	L66	l65 and @ad<19980715	209
☐	L65	l50 same acne	922
☐	L64	l63 and @ad<19980715	34
☐	L63	L62 and cosmetic	332

☐	L62	L60 and acne	374
☐	L61	L60 same acne	40
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☐	L59	L58 and acne	36
☐	L58	L57 same (vitamin adj (c or E))	165
☐	L57	l50 near2 (antioxidant)	1802
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☐	L55	5869062.pn.	2
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☐	L53	L52 and (topical or cosmetic)	123
☐	L52	L51 and ((calcium or magnesium or sodium or potassium or barium or strontium copper or manganese) adj2 peroxide)	187
☐	L51	L50 and (calamine or (zinc adj oxide))	10867
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☐	L46	5556871.pn.	2
☐	L45	6337320.pn.	2
☐	L44	4938969.pn.	2
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☐	L42	l35 and ((zinc adj oxide) or calamine)	187
☐	L41	l40 and @ad<19980715	10
☐	L40	l36 and (topical or cosmetic)	122
☐	L39	L37 and (zinc adj oxide)	19
☐	L38	L37 same (zinc adj oxide)	1
☐	L37	L34 same (glutamine or cystine or lysine or proline or cysteine or lysin or arginine or histidine or tyrosine or prolin or glutamine or glycine or glycin or valine or leucine or isoleucine or asparagine or serine or (amino adj acid))	166
☐	L36	L35 and (zinc adj oxide)	186
☐	L35	L34 and (glutamine or cystine or lysine or proline or cysteine or lysin or arginine or histidine or tyrosine or prolin or glutamine or glycine or glycin or valine or leucine or isoleucine or asparagine or serine or (amino adj acid))	2172
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☐	L33	L32 not benzoyl	21
☐	L32	L31 and (cosmetic or topical)	40
☐	L31	l30 and @ad<19980715	67
☐	L29	L22 same skin	16
☐	L28	L22 same cosmetic	6

☐	L25	L24 and skin	38
☐	L24	l23 and @ad<19980715	104
☐	L23	L22 and (topical or cosmetic)	298
☐	L22	inorganic adj peroxide	5007
☐	L21	(inorganic adj peroxide) same calcium	341
☐	L20	L19 and (topical or cosmetic)	26
☐	L18	L17 and (zinc adj oxide)	889
☐	L17	(inorganic near peroxide)	6237
☐	L16	L15 and zinc	48
☐	L15	L13 and (topical or cosmetic)	90
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☐	L13	l12 and @ad<19980715	107

END OF SEARCH HISTORY